G. M. GITHENS.

Rock-Drills.

No. 212,598. Patented Feb. 25, 1879.

Fig. 1.

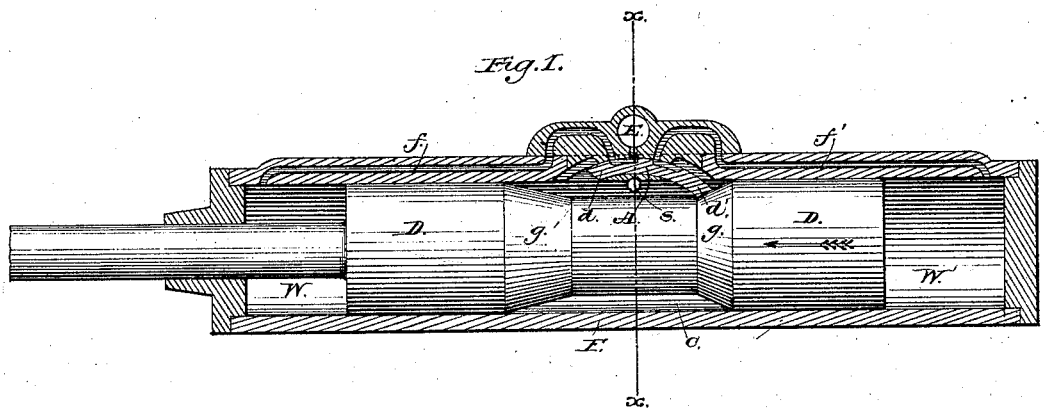


Fig. 3.

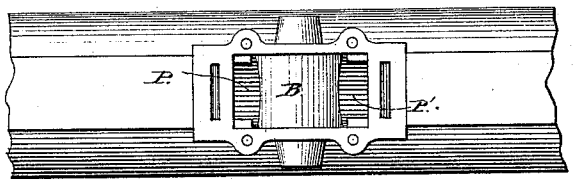
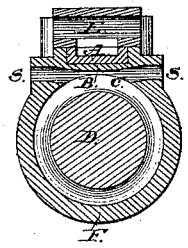


Fig. 2.



Attest:

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UNITED STATES PATENT OFFICE.

GEORGE M. GITHENS, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN ROCK-DRILLS.

Specification forming part of Letters Patent No. **212,598**, dated February 25, 1879; application filed January 5, 1878.

To all whom it may concern:

Be it known that I, GEORGE M. GITHENS, of the city of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Rock-Drilling Machines, which improvement is set forth in the following specification, reference being had to the accompanying drawings.

My improvement relates to that class of rock-drills known as the "percussion," having a steam or air cylinder with drill attached to one end of the piston-rod, the parts being arranged so as to combine simplicity and durability with certainty of action.

The nature of my invention consists in a novel arrangement of the valve, piston, and live-steam chest relatively to each other, so that the ends of the valve as it moves project alternately into a live-steam chest within the body of the central part of the cylinder, and in the pathway of the piston, whereby the valve is moved directly by the piston without the use of any intermediate parts.

The object of my invention is to produce a rock-drill that can be used in all the various positions required in mining, and especially in positions close to the top of the cutting and to the vertical sides in sinking shafts and open cuts, and also to produce a machine that shall have the fewest number of moving parts, which, in all rock-drills, must necessarily be very perishable from the severe concussions to which they are subjected.

Figure 1 is a longitudinal section of the cylinder, valve, steam-chest, and steam-chest cover, which latter contains the valve-seat and steam and exhaust passages. Fig. 2 is a transverse section of the same through the line *x x*, Fig. 1. Fig. 3 is a top view of that part of the cylinder on which is bolted the steam-chest cover.

Referring to the figures, F is the cylinder, which is bored out to receive the piston D, which is a straight cylindrical piece having packing-rings near each end, and which is turned down to a smaller diameter near the center, so as to produce inclined shoulders *g* and *g'*, to move the valve, and also to give room around it to form the steam-chest C. S is the steam-opening for admitting steam to the steam-chest, and is cast on the body of the cylinder. E is the exhaust-passage, to allow the steam, after being used, to escape, and is cast in the steam-chest cover. *f* and *f'* are the steam-passages for admitting steam to and from the opposite ends of the piston D. The termination of these passages near the center of the cylinder meet corresponding passages in the steam-chest cover, in which is formed the valve-seat, which covers the circular valve A, the circle of which is preferably struck from a point at or near the center of the cylinder.

Through the wall of the cylinder, at the points P and P', are openings which allow the ends *d* and *d'* of the valve A to project into that part of the steam-chest within the cylinder, and also to allow the steam to pass through them from the steam-chest to be distributed by the valve A. Between these openings a portion, B, of the wall of the cylinder is left as a support to keep the valve A from falling away from its seat when relieved from pressure. At all other times it is held against the seat by the pressure of the steam.

The position in the drawings shows the piston D traveling in the direction indicated by the arrow, with the steam-pressure in the upper end, W', of the cylinder, and the lower end, W, open to the atmosphere through the exhaust E.

It will be seen that the travel of the piston in this direction is almost completed, and that the inclined shoulder *g* is in contact with the end *d'* of the valve A, which, by a continued movement of the piston in the same direction, must be moved into a position to reverse the direction of the steam, and throw the opposite end, *d*, of the valve into that part of the steam-chest within the cylinder, to be in turn moved by the inclined shoulder *g'* of the piston as it moves in the opposite direction, thus bringing the parts into their first position, which change of positions must occur as long as the machine is supplied with steam.

I wish it understood that I do not confine myself to any particular proportioned inclines on the piston.

Having thus explained the nature, construction, and operation of my improvement, what I claim as my invention, and desire to secure by Letters Patent, is—

In a direct-acting engine, a valve provided with steam-passages, and sliding endwise in the arc of a circle, in combination with inclines upon the piston for communicating the end movement to the valve, substantially as specified.

GEO. M. GITHENS.

Witnesses:

GEORGE M. BALL,

JAS. H. WHITEHORNE.